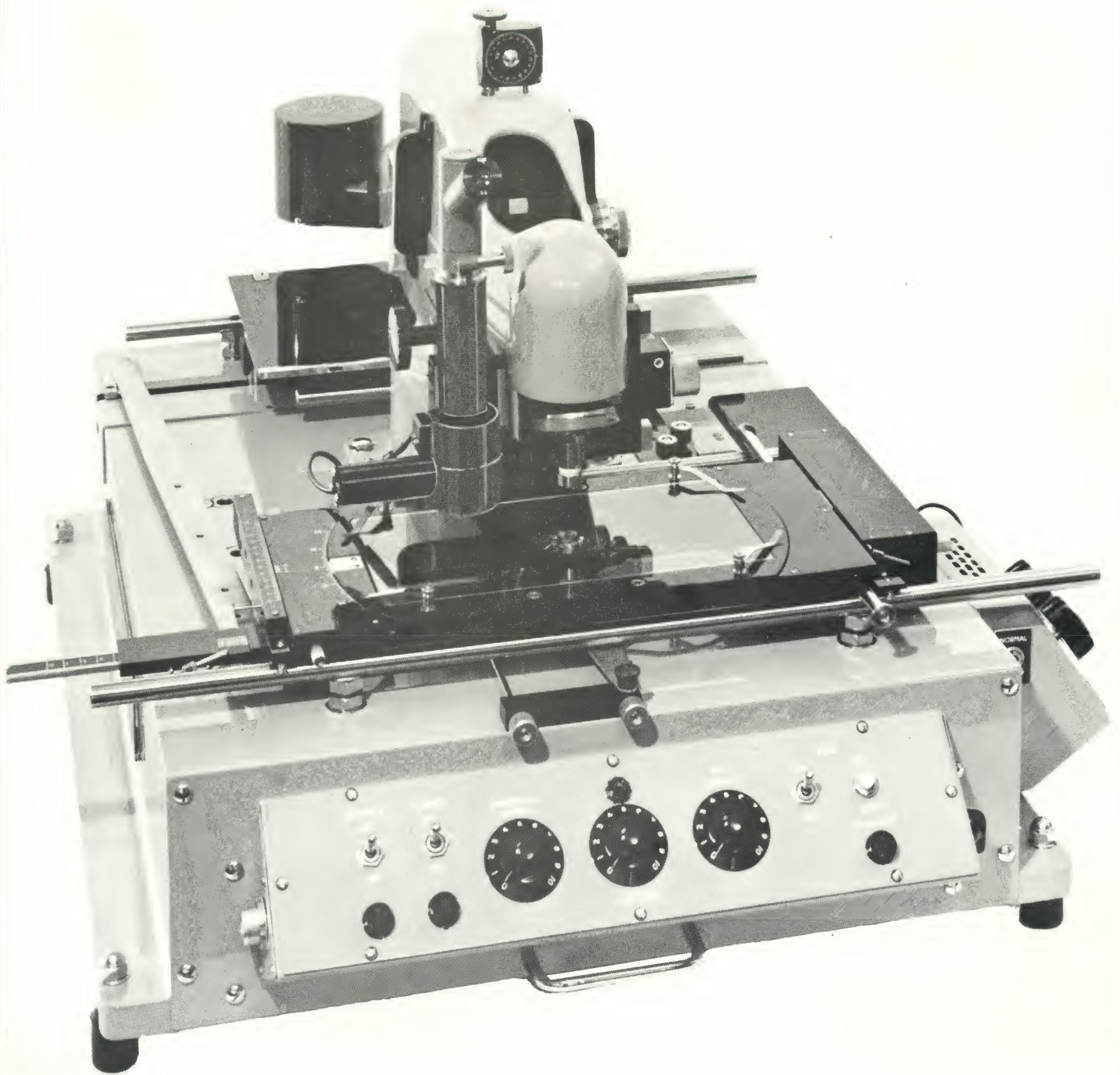


3CS

Microdensitometer

The worlds' most widely used
Microdensitometer



Joyce-Loebl

3CS

Microdensitometer

Introduction

The Joyce-Loebl Microdensitometer 3CS is a high resolution flat bed instrument which scans the specimen and plots density versus position in the form of a graphical trace on an integral chart recorder. The specimen table and chart recorder table are linked by a ratio arm which can be adjusted to give ratios of specimen to record movement from 1 : 1 to 1 : 1000 (i.e. variable scale expansion between sample and record). This precise mechanical linkage allows accurate and repeatable distance measurements to be made on the specimen.

The instrument operates on the double beam null balance system which gives stability and exceptionally good repeatability. A calibrated optical grey wedge serves as the invariable internal measuring standard. The wedge carriage directly coupled to the recorder pen and thus output can be recorded directly in optical density. The instrument measures density up to 6D and interchangeable grey wedges with dynamic ranges from 0.2D to 4.5D are available. The baseline is continuously variable over the full density range of the instrument. Special electronic circuitry automatically retards the scanning speed when high rates of change of optical density are encountered. Maxima are thus always correctly recorded.

The measuring slit is calibrated in both height and width. Scanning resolution can be varied down to 1 micron — though actual resolution obtainable depends upon sample and operating conditions. An important feature of the instrument is the microscope projection system which projects an image of the sample onto the slit. Samples are thus easily accurately aligned, and can be monitored during scanning.

The basic Microdensitometer is complete in itself. All extra modules and attachments described in this leaflet can be fitted either initially or at a later date.

Look at these benefits

■ High Resolution

Continuously variable down to 1 micron — depending upon scanning conditions. Allows a wide range of specimens to be scanned.

■ Double Beam Optical System

The double beam null balance system gives exceptional stability and reproducibility.

■ Wide Density Range

Full scale variable from 0.2D to 6.0D. Enables optimum sensitivity to be achieved.

■ Large Specimen Table

Enables the instrument to be used over a wide range of specimen sizes.

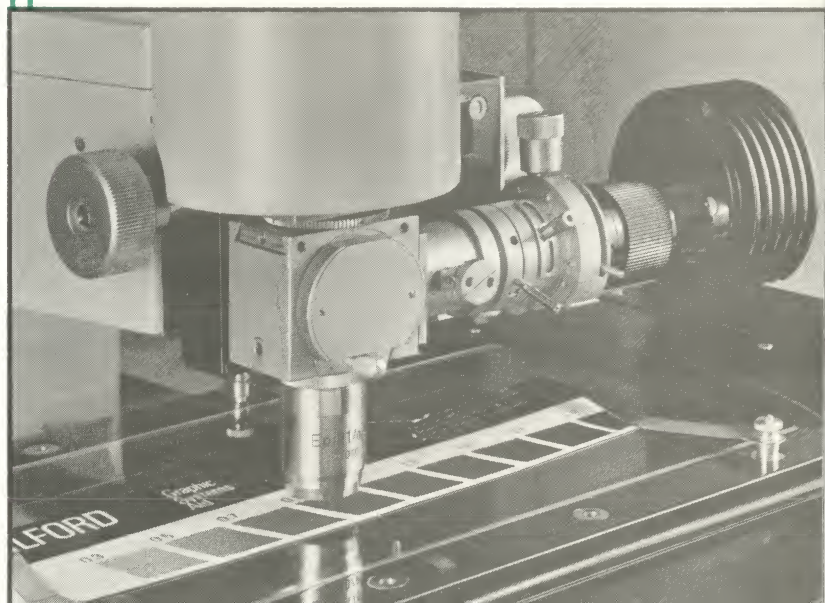
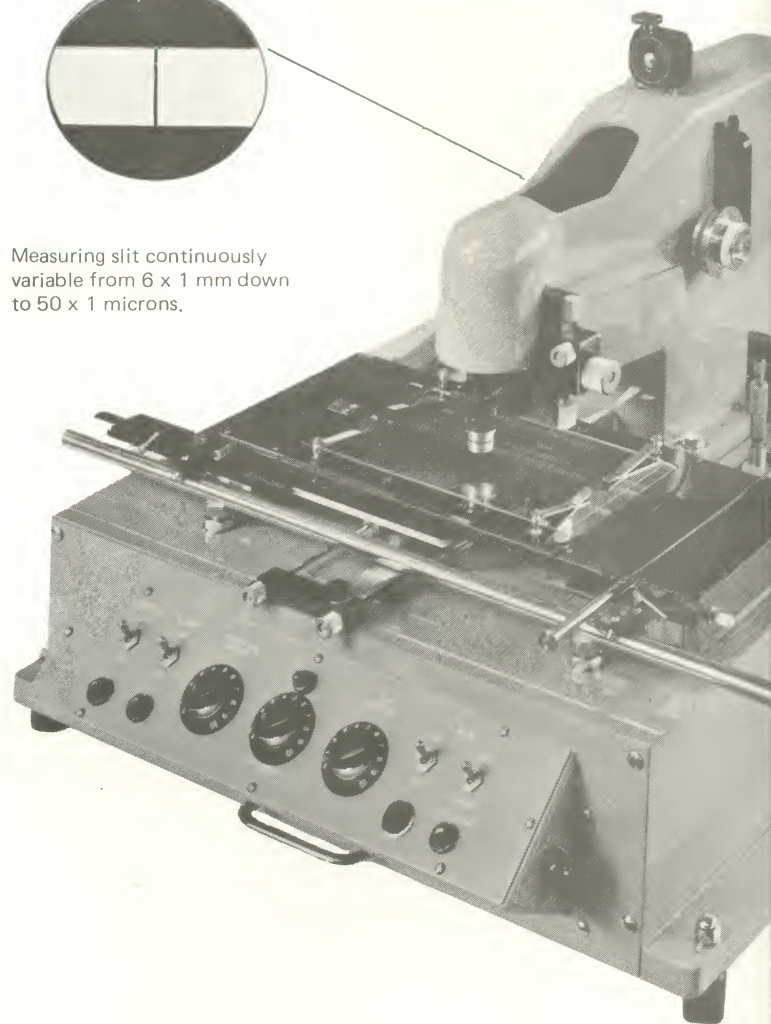
■ Monitoring

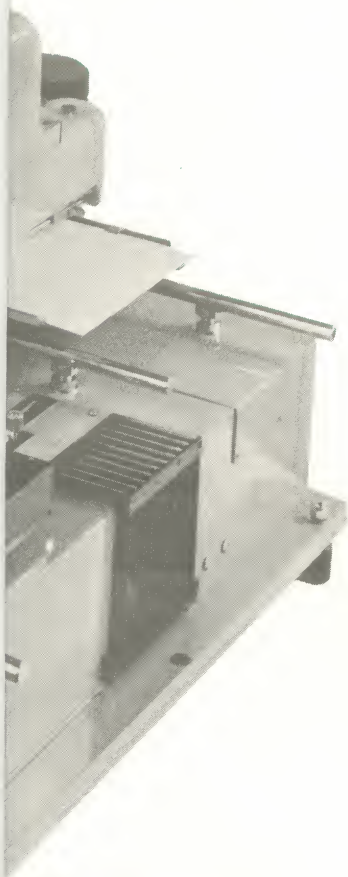
The specimen and its enlarged image, projected on to the measuring slit, are visible throughout the scanning process.

■ Versatility



Measuring slit continuously variable from 6 x 1 mm down to 50 x 1 microns.





Attachments

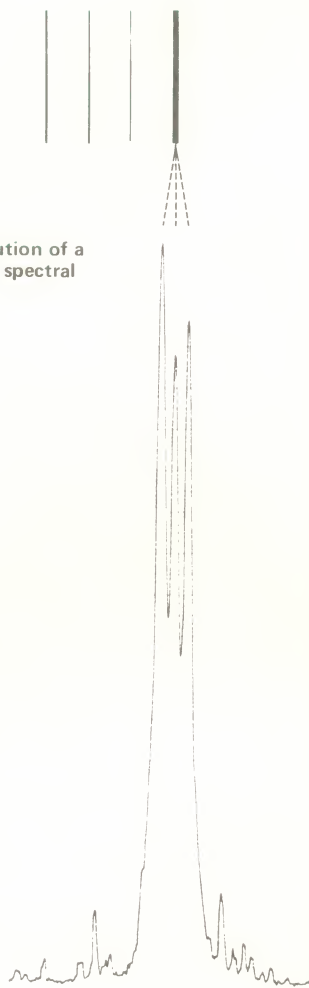
Reflectance Attachment RA2

This attachment has improved capability and performance over the other systems for measuring reflectance density on scanning microdensitometers.

The design allows specimens to be scanned to a high spatial resolution over a wide density range. These benefits are important to those users working or researching in the print and reprographic industries or studying the surface properties of metallurgical and other opaque materials. In order to give the best performance over the wide range of applications where samples need to be scanned in reflectance, dark field illumination is used. This allows the specular component of the reflected beam to be ignored thus enhancing the contrast when variations in diffuse density are of interest.

Dark fieldwork is done using a x 11 epi-incident light objective giving a resolution of 50 line pairs per mm — the angle of incidence is 45° and the reflected beam is collected at 60° .

Resolution of a triplet spectral line.



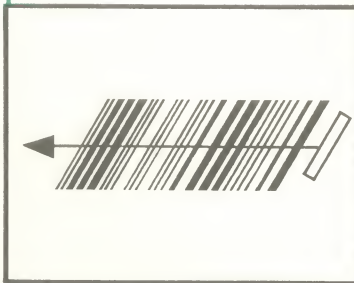
Applications

The applications of microdensitometry are as varied as the microscope from which it evolved. The Microdensitometer makes quantitative measurements of the optical density of very small areas of specimens which may be of any form, but are usually photographic film or plate. Photography is one of the most versatile methods of recording scientific information be it in microscopy, spectroscopy, radiography, holography, non-destructive testing, aerial survey, or in almost any scientific or engineering field. Microdensitometry is an essential tool for extracting quantitative information from such photographic films.

Modern photographic techniques are extremely sensitive and accurate. The Joyce-Loebl Microdensitometer 3CS has the necessary photometric and mechanical precision for the evaluation of such images. The instrument may also be used to make measurements directly from thin transparent specimens without an intervening photographic stage, e.g. biological samples mounted on microscope slides.

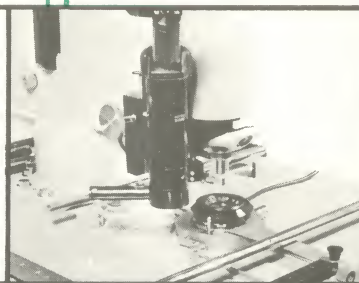
The instrument scans specimens varying in size from a few microns square up to 240 mm x 115 mm producing an output in the form of a graphical trace of optical density against position. Spatial resolution, scanning speed, density range and specimen to record magnification can be selected according to requirements. A considerable range of optical and mechanical attachments are available for special applications.

Lists are available of over one hundred references to publish work for which the Microdensitometer 3CS has been used for evaluating photographic images and original specimens. Copies of these lists are available on request.



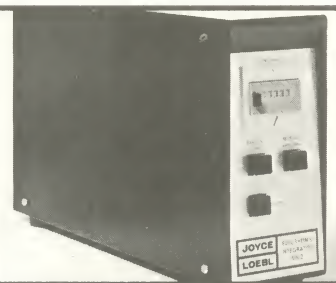
Beam Rotation Attachment

The measuring slit is normally perpendicular to the scanning direction. This attachment enables the slit to be rotated so that it can be set at any angle to the scanning direction. This is useful when scanning a series of lines, such as spectrographic plate, which may not necessarily be perpendicular to the desired scanning direction.



Specimen Viewer Attachment

A monocular viewer with a wide field of view enables the operator to observe the specimen in the vicinity of the slit during setting up. An auxiliary sub-stage illumination system is incorporated. This attachment is particularly useful when setting up specimens with high background density.



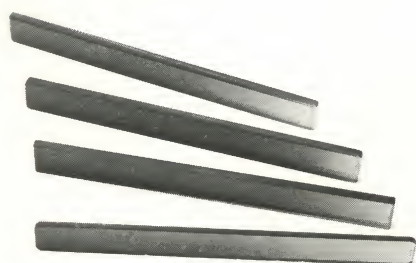
Integrator Attachment

This attachment integrates the area under a density profile and shows the result on a six digit display. A reverse baseline facility is incorporated so that either positive or negative areas may be integrated.

3CS

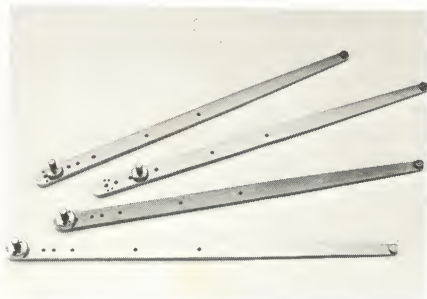
Microdensitometer

Microdensitometer 3CS accessories



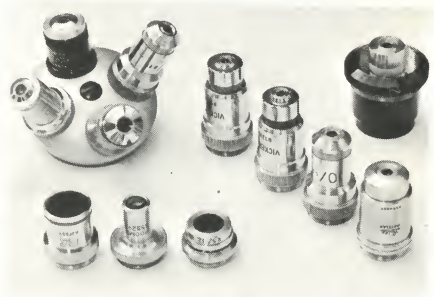
Neutral Density Wedges

Optical neutral density wedges are used as the internal reference for the Microdensitometer measuring system. A set of 6 wedges is supplied as standard with the microdensitometer allowing scanning to be carried out over the range 0.2 to 6D. All wedges are supplied with a calibration chart.



Ratio Arms

Scale expansion in the X-axis is performed by changing the ratio arm which links the record and specimen tables. The standard ratio arm supplied with the instrument provides ratios of 1 : 1, 1 : 2, 1 : 5, 1 : 7.5, 1 : 10, 1 : 20 and 1 : 50. Other arms with ratios of up to 1 : 1000 are available.



Objective and Condenser Lenses

The magnification of the sample image, projected onto the measuring slit, is determined by the objective lens. The magnification, combined with the actual setting of the measuring slit size, determines the resolution of the instrument. A range of lenses is available providing magnifications from X4 to X80. A complementary selection of condenser lenses provides the appropriate intensity of illumination on the sample.

Specification

Resolution	Effective measuring slit continuously variable from 6 x 1 mm down to 50 x 1 microns.
Density Range	Full scale deflection variable from 0.2D to 6D.
Repeatability	Density: 0.5% of Full Scale Deflection Position: 0.5% Scan Length.
Scanning Area	240 mm x 115 mm. Specimens larger than the scanned area can be accommodated on the stage. Automatic scan in X axis. Manual movement in the Y axis $\pm 16^\circ$ manual stage rotation.
Recorder Output	Integral flat bed chart recorder. Ratio of specimen to record table movement adjustable from 1 : 1 to 1 : 1000. Voltage proportional to density measurement available for external recorder.
Light Source	Tungsten Halogen Lamp.
Supply	110, 220/240 V, 50/60 Hz.
Shipping Weight	(packed) 160 kgs.
Bench area required	63 cms wide x 82 cms deep.

Joyce-Loebl worldwide service

It is not only the superior quality and performance of our instruments that has made us world leader in the field of image analysis but also the quality and reliability of our after-sales service.

Service contracts are available for all instruments anywhere in the world. These cover for two routine maintenance visits and two emergency call out visits per year including all travel and labour costs.

We would be pleased to quote you our current rates for your location upon request.